

Feb. 28, 1939.

L. J. STEVENS
ANNUNCIATOR SYSTEM

2,148,913

Filed April 3, 1935

2 Sheets-Sheet 1

Fig. 1

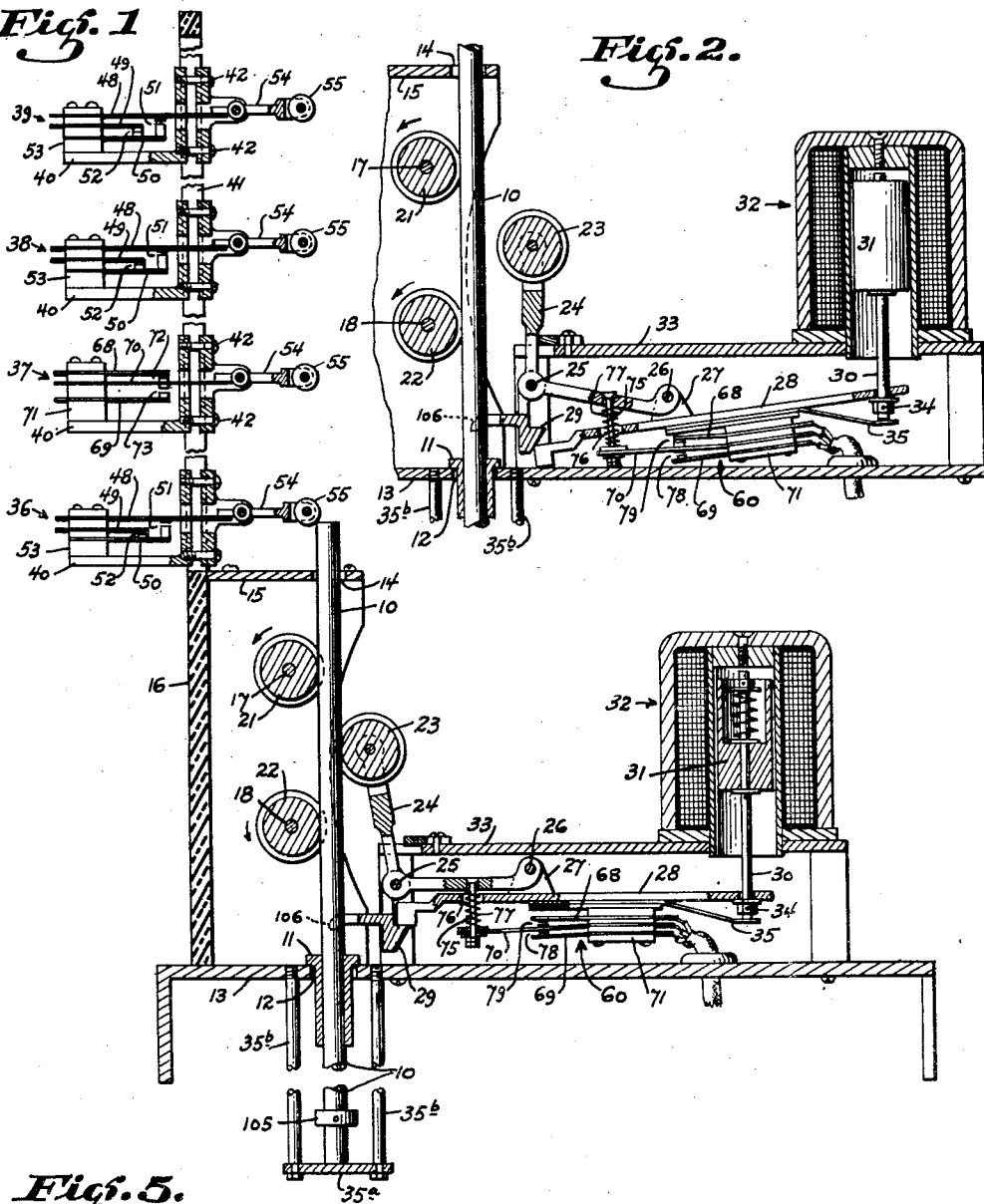
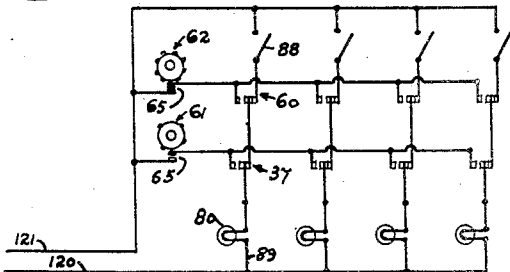


Fig. 5.



BY

Chas. E. Townsend,
ATTORNEY.

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Fig. 3.

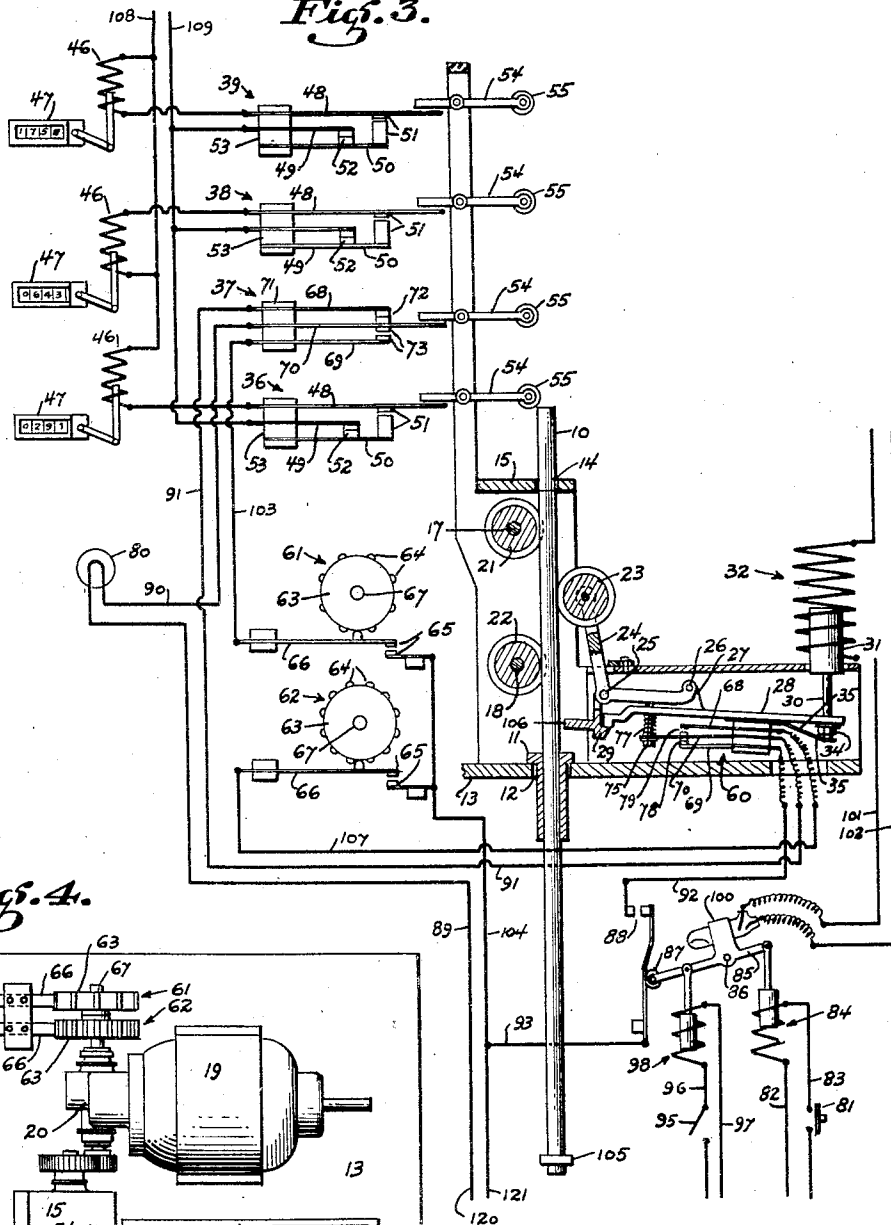
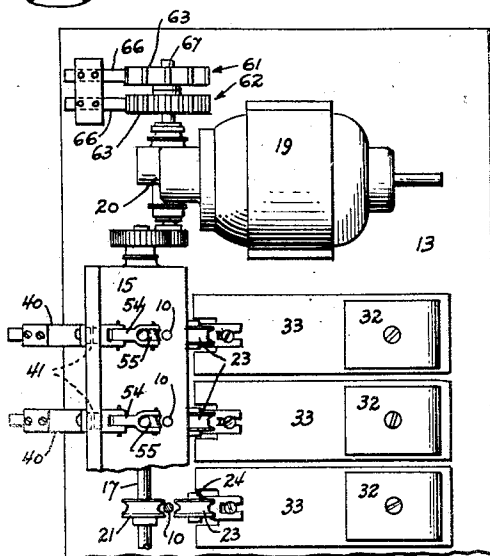


Fig. 4.



INVENTOR.
Leo J. Stevens

BY

Chas. E. Townsend.
ATTORNEY.

UNITED STATES PATENT OFFICE

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ANNUNCIATOR SYSTEM

Leo J. Stevens, San Francisco, Calif.

Application April 3, 1935, Serial No. 14,481

2 Claims. (Cl. 177—336)

This invention relates to improvements in annunciator systems and pertains particularly to a system in which all operations of the system may be observed from one station thereof.

In the operation of elevators, and particularly where more than one elevator is used, it is customary to employ annunciator systems which comprise push button switches located at the several floors served by the elevators and generally referred to as "hall buttons". These hall buttons are operable by waiting passengers to actuate a signal in a car approaching the floor on which the button is pressed or in some cases to cause the car to stop automatically when it reaches the floor. In either event the hall button may also control a signal at a central station, such, for example, as on a panel disposed on the main floor in view of an attendant whose duty it is to dispatch the elevator cars. With the aid of these signals and other signals apprising the dispatcher of the positions of the various cars, it is possible to accelerate the service to waiting passengers.

In my co-pending application entitled "Annunciators", filed May 15, 1933, Serial Number 671,038, I have described a system in which the dispatcher's signals operated by the hall buttons are caused to operate intermittently a predetermined period of time after the button has been actuated, so that the dispatcher is informed that a passenger has waited longer than is desired and may direct a car promptly to answer the call.

It is the object of the present invention to provide an improved system of the kind described in my said co-pending application, to provide a system in which simple and inexpensive mechanism will cause automatic signalling to occur after the lapse of succeeding time intervals and to provide a system in which counting devices may be employed to register the total number of calls passing over the system and to register separately the numbers of calls for which the different time interval signals were placed in operation.

For purposes of illustration I have chosen to show and describe my invention as used in connection with elevators. However, as the description proceeds it will appear that the invention is adapted to use in connection with telephones, hospital call systems, and various other things where annunciator systems are employed.

One form of my invention is exemplified in the accompanying drawings, to which reference is made in the following specification. In the

specification further of the objects and advantages of my invention are made apparent.

In the drawings,

Fig. 1 is a vertical sectional view of a portion of the operating mechanism of an annunciator system, constructed in accordance with my invention.

Fig. 2 is a fragmentary view of certain parts shown in Fig. 1, illustrating their positions at a different stage of operation of the mechanism.

Fig. 3 is a wiring diagram of one unit of the annunciator system with the operating mechanism illustrated schematically.

Fig. 4 is a plan view of one end of a group or bank of the units shown in Fig. 1; and

Fig. 5 is a wiring diagram showing a plurality of the annunciator units in a circuit.

In Figs. 1 and 4 of the drawings, I show structure which includes the switches for operating the signals, the switches for operating the counting devices, and the timing mechanism for controlling all of these switches selectively in proper sequence and at predetermined time intervals. The mechanism for one hall button is illustrated in Fig. 1 and such mechanisms are adapted to be arranged in banks as illustrated in Fig. 4, there being an identical such mechanism for each hall or floor.

In Fig. 1 a vertically reciprocable rod 10 is illustrated as loosely mounted in a bushing 11 at its lower end, which is received in an enlarged hole 12 permitting slight lateral movement of the rod with respect to a supporting base 13 upon which the device is mounted. The upper end of the rod 10 passes through a hole 14, which is also enlarged to permit lateral movement of the rod in a bracket 15 carried by a vertical wall 16 supported in an upright position relative to the base 13. The rod 10 is shown as round in cross section but may be of any shape desired. A pair of horizontally disposed shafts 17 and 18, either one or both of which may be continuously rotated by a motor 19 (see Fig. 2) through reduction gearing 20, carry friction rollers 21 and 22, respectively.

These friction rollers are preferably formed of soft material, such, for example, as rubber, and may if desired be grooved to fit the rod 10.

Normally the reciprocable rod 10 is disposed closely adjacent to but not in contact with the rotating rollers 21 and 22. In order that the rod may be pressed into engagement with the friction rollers to be advanced upwardly by their rotation, an idler roller 23 is carried by one end of a bell crank 24 adjacent the opposite side of the rod

10. The bell crank is pivotally mounted on a shaft 25 and also has a pivotal connection 26 with a post 27 fixed to a lever 28. One end of the lever 28 is supported on a pawl 29 and its opposite end is connected by a rod 30 with the armature 31 of a solenoid generally indicated at 32 and supported on a plate 33 disposed above the main base plate 13. A collar 34 on the lower end of the rod 30 engages the lever 28 to swing it upwardly upon upward movement of the armature 31 and means such as an arm 35 is provided to connect the lever and rod for downward movement. The arm 35 is preferably of resilient material to prevent undue shock when the armature is allowed to drop. When the hall button which controls this mechanism is pressed, a circuit is closed which energizes the solenoid 32 to raise the armature 31 thereof, thereby swinging the lever 28 upwardly and moving the bell crank 24 about its pivot 25. This causes the idler roller 23 to engage the rod 10 and force it into contact with the rotating friction rollers 21 and 22, the direction of rotation of these rollers being such as to cause the rod to move upwardly. This rod will move upwardly continuously at a slow rate of speed, until the solenoid 32 is deenergized or until it reaches its topmost position, whereupon the mechanism hereinafter to be described will cause it to be returned to its starting point. A plate 35^a, suspended from the base 13 by posts 35^b, limits the downward movement of the rod.

During the upward movement of the rod 10 it engages and actuates switches generally indicated at 36, 37, 38 and 39. These switches are supported by brackets 40 which may be secured to the wall 16 for adjustment along a vertically disposed slot 41 by means of screws 42 which serve to draw separable halves of the brackets into clamping engagement with the wall adjacent the slots.

The three switches shown at 36, 38 and 39 serve the purpose of closing circuits momentarily through solenoids, diagrammatically illustrated at 46 in Fig. 3, to actuate counting devices 47. Each of these switches is shown as comprising three resilient conductor arms 48, 49 and 50. The arms 48 and 50 carry normally open contact points 51 while the arms 49 and 50 carry normally closed contact points 52. The three arms are clamped between and supported in spaced relation by dielectric blocks 53 and the uppermost arm 48 extends to a position where it may be engaged by a pivoted lever 54 supported by the bracket 40 and having an end, preferably provided with an anti-friction roller 55, disposed in position for engagement by the rod 10 during its upward movement. Either the lever 54 or roller 55 or both should be formed of a non-conducting material. Such engagement will rock the lever 54 and flex the arm 48 downwardly. The initial downward flexing of the arm 48 closes the contacts 51 to complete a circuit through arm 48, contacts 51, arm 50, contacts 52, and arm 49. After contact of points 51 has been established farther downward movement of the arm 48 imparts movement to arm 50 and presently causes breaking of the points 52 to open the circuit. The result is a momentary energization of the solenoid 46, to actuate the counting device 47, and return either by gravity or under spring pressure to its normal position.

The function of the switch 37 and of a similar switch 60 carried by the lever 35 is to control circuits through current interrupters or blinker switches 61 and 62. These blinker switches

shown diagrammatically in Fig. 3 may be of any desired type and in the form shown comprise rotors 63 having peripherally spaced lobes 64 to cause intermittent closing of points 65 one of which is carried by a spring arm 66. The interrupter 61 is shown as having less lobes and greater spaces between its lobes than the interrupter 62. The former may for this reason be referred to as the "slow blinker" and the latter as the "fast blinker". Any suitable means may be employed for rotating the blinker rotors and I have chosen as illustrated in Fig. 4 to position them on a shaft 67 driven through the reduction gearing 20 of the motor 19.

The switches 37 and 60 are shown as comprising spaced conductor arms 68 and 69 having a flexible conductor arm 70 disposed between them, all being suitably clamped between dielectric blocks 71. In the switch 37 the arms 68 and 70 carry normally closed contact points 72 and the arms 70 and 69 carry normally open points 73. The points 72 are opened and the points 73 are closed upon contact of the rod 10 with the outer end of the lever 54 connected with the flexible conductor arm 70. In the switch 60 the central flexible arm 70 is connected at its outer end with a pin 75 depending from the bell crank 24 and extending through an opening 76 in the lever 28. A coil spring 77 surrounding the pin 75 bears downwardly on the arm 70 normally to close point 78 carried by the arms 68 and 70. Contact points 79 on the arms 68 and 70 will be closed upon release of the lever 28 by the pawl 29, as will hereinafter be described, causing the parts to move to the position illustrated in Fig. 2.

An understanding of the manner in which the system operates may best be had from reference to Fig. 3, wherein a signal is shown in the form of a lamp 80. This lamp 80 will be mounted on a panel in view of the elevator dispatcher, and may be used in combination with suitable indicia to inform the dispatcher as to the number of the floor upon which the hall button has been pressed. There will of course be a similar lamp for each floor, as well as similar mechanism to that above described, excepting the counters and blinker switches for operating each lamp. The hall button controlling the lamp 80 is shown at 81, and upon being pressed will close a circuit through conductors 82 and 83 to energize the solenoid 84 which rocks a lever 85 about its pivotal support 86. One end of the lever 85, which may be provided with an anti-friction roller 87, will close a switch 88 through a circuit which includes the lamp 80. This circuit, which causes the lamp 80 to burn constantly, includes the wire 89 which leads through the lamp to wire 90 and points 72 of the switch 37. Wire 91 leads to the switch 60 and through the closed points 78 thereof, thence to the wire 92, switch 88 and wire 93. When the elevator stops at a floor in answer to the signal, it closes a canceling switch 95, through conventional mechanism not here disclosed, to complete a circuit through wires 96 and 97, energizing a solenoid 98 to return the lever 85 to the position in which it is shown, thus breaking the circuit which has been closed by the switch 88.

In order to produce intermittent energization or blinking of the lamp 80 in the event that the call is not answered within a predetermined period of time, I provide a switch to be operated by movement of the lever 35 to start the rod 10 on its course of gradual upward movement. This switch, which may be of any suitable type, is here

shown as a mercury switch 100 secured to the lever 85 so that upon rocking movement of the lever to energize the lamp 80 the switch will close a circuit through wires 101 and 102 to energize the solenoid 32. This imparts movement to the lever 28 which, as described above, swings the idler 23 against the rod 10, which, upon being pressed into contact with the continuously rotating friction rollers 21 and 22, begins its upward movement. Disregarding for the present the action of the rod 10 on the counting devices, it will be apparent that upon the lapse of a predetermined time, for example, thirty seconds, the rod will actuate the switch 37, breaking the contact between the points 72 thereof and making contact with the points 73. In this position the switch 37 cuts the slow blinker 61 into circuit with the lamps 80 through wires 103 and 104. Assuming that the call is still unanswered, the rod 10 continues its upward movement until at its topmost position a collar 105 adjustably secured in a position adjacent its lower end, contacts the bushing 11 and raises this bushing into engagement with the finger 106 carried by the pawl 29. This engagement trips the pawl 29, permitting the lever 28 supported thereby to fall to the position illustrated in Fig. 2.

Movement of the lever 28 to this position swings the idler roller 23 away from the rod 10, whereupon the rod falls by gravity to its lower position, releasing the switch 37 and cutting out the slow blinker.

It is also a function of this movement of the lever 28 to operate the switch 50, breaking the contact between the points 78 thereof and making contact between the points 79 thereof, thus cutting in the interrupter 62 through wires 107 and 108. The lamp 80 will then continue to operate through the fast blinker until the call is answered. The device may be regulated to operate the fast blinker switch upon the lapse of sixty seconds or any desired time period greater than that at which the slow blinker was operated. Either or both time periods may be varied by adjustment of the position of the switches, the speed of the friction rollers, and the position of the collar 105 on the rod 10.

Upon stopping of an elevator at the proper floor, the canceling switch 95 is closed to rock the lever 85 and open the mercury switch 100. This de-energizes the solenoid 32, the armature 31 of which falls downwardly due to its own weight, rocking the lever 28 about the pivot 26, whereupon the free end of the lever will be raised to its original position of engagement with the pawl 29. In the event that the call is responded to at any time prior to the movement of the rod to its topmost position, the solenoid 32 will be de-energized in the manner described above, with the result that the lever 28 will be returned to its normal position illustrated in Fig. 3, moving the idler 23 away from the rod 10 and permitting the rod to return by gravity to its original position.

Counting mechanisms, one set of which will suffice for the entire system, may be employed to register the number of times that elevators have been called, to register the number of times that the calling passenger has had to wait more than forty seconds, and to register the number of times the passenger has been required to wait more than sixty seconds, these time periods of course being variable. Such counting mechanisms are illustrated in Fig. 3 of the drawings and may, of course, be supplemented by further counting mechanisms if desired, to keep a more detailed

record of operation. The counters, which may be of any conventional form, are illustrated at 47 and are actuated through the solenoids 46 with which they are suitably connected. The counter switch 36 which controls a circuit, including wires 108-109, to the first counter, is so positioned that the operating lever 54 thereof will be engaged by the rod 10 upon its initial upward movement. This counter will therefore register the total number of calls. Counter switch 38 may be positioned above the slow blinker switch 37, a distance which will be traversed by the rod 10 in ten seconds. This counter will therefore register the number of calls in which forty seconds elapsed and in which the slow blinker was placed in operation ten seconds before the call was responded to. The third counter switch, indicated at 39, is positioned for operation by the rod 10 as it attains its topmost position and at substantially the same time that the pawl 106 releases lever 28 to place the fast blinker in operation. Thus the counter which is controlled by the switch 39 will totalize the number of calls where the passenger was required to wait sixty seconds, and the fast blinker was placed in operation. As the counter switches close a circuit momentarily only upon the upper movement of the rod 10, the return movement of the rod has no effect upon the counters.

The annunciator system above described is preferably to be used in connection with a separate system of any well known kind that advises the elevator dispatcher as to the position of any elevator at any time. With this system the dispatcher will be advised by illumination of a signal lamp when a call has been placed upon a certain floor. In large buildings, where the elevator traffic is heavy, it is not uncommon for many such calls to take place in a few seconds. If, due to the heavy traffic, a call is not responded to within thirty seconds, the indicator lamp will blink, notifying the dispatcher that a passenger has been waiting for an excessive period of time; whereupon he may dispatch an elevator directly to that floor, leaving other calls, more recently made, to be attended by other elevators on their usual route. In rush periods such as frequently occur at lunch-time and other busy times of the day, it may be impossible to answer all thirty-second signals promptly, and in that case any calls which are not responded to within sixty seconds will cause the fast blinker to operate and may be given preference over all other calls. The efficiency of the entire system may be judged and improved through a study of the totals registered by the several counting devices.

The invention described above is designed for ready adjustment to meet various conditions and requirements of particular elevator systems. The timing of the entire annunciator system may be marked by adjustment of the speed of the motor 19 or the ratio of the reduction gearing 20. The time of operation of any counter or of the slow blinker may be varied by adjustment of their respective switches vertically of the supporting panel and the fast blinker will be brought into operation at a time depending upon the position of the collar 105 which is adjustably mounted adjacent the lower end of the rod 10.

In order that any desired number of the units illustrated in Fig. 3 may be used together to serve several floors without possibility of the operation of one unit interfering with that of the other, I wire the units in the manner illustrated in Fig. 5. In this figure four units are illustrated,

but it will be readily understood from the diagram that any further number of units could be added without alteration of the system shown. Electrical energy from any source is carried by 5 main wires indicated at 120 and 121. The current flows through the wires 38 which lead from the wire 120 to the lamps 30 then through the slow blinker switches 37, fast blinker switches 60 and through switches 39 controlled by the hall buttons 10 to the main wire 121. The slow blinker switch 31 and the fast blinker switch 32 may be cut into the circuit by any one of the switches 37 and 60, respectively. Due to the manner of wiring illustrated and due to the fact that the switches 37 15 and 60 are of the kind which as described above break one circuit before they complete the other circuit, all possibility of interference between units or of the operation of one unit affecting the other in any manner, is eliminated.

20 While I have shown but one form of my invention and described the same more or less specifically, it should be understood that various changes may be resorted to in the construction and arrangement of the several parts, within the spirit 25 of the appended claims.

Having described my invention, what I claim is:

1. In an annunciator system of the character described having a signal, a plurality of switches corresponding to a plurality of registers and a 30 second plurality of switches corresponding to a plurality of circuit interrupters; a lever switch-operator for each switch, said levers being pivoted about an axis perpendicular to their lengths and being aligned in a plane perpendicular to 35 their pivotal axes the pivots being spaced along a line perpendicular to the normal positions of the levers and lying in said plane, each of said lever switch-operators having a roller attached at one end, the axis of rotation of said roller being

parallel to the pivotal axis of the lever, a longitudinally reciprocating rod positioned to successively engage said rollers, friction drive means for the rod, said means including a pair of driving 5 wheels and a third wheel engaging the rod on opposite sides, the third wheel being normally out of engagement with the rod, said friction drive means imparting a time controlled movement to said rod to successively actuate said lever switch-operators, and thus operate said counters and 10 selectively energize said signal through an interrupter in accordance with the elapsed time following initiation of the actuating means, said lever switch-operators being retained in actuated position when their rollers are in engagement 15 with said rod.

2. In an annunciator system of the character described having a signal, a plurality of switches corresponding to a plurality of registers and a 20 second plurality of switches corresponding to a plurality of circuit interrupters; a pivoted lever switch-operator for each switch, said levers having ends disposed in alignment, a longitudinally reciprocating rod positioned to successively engage 25 said aligned ends, friction drive means for the rod, said means including a pair of driving wheels and a third wheel engaging the rod on opposite sides, the third wheel being normally out of engagement with the rod, said friction drive means imparting a time controlled movement to 30 said rod to successively actuate said lever switch-operators, and thus operate said counters and selectively energize said signal through an interrupter in accordance with the elapsed time following initiation of the actuating means, said 35 lever switch-operators being retained in actuated position when their ends are in engagement with said rod.

LEO J. STEVENS.